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AUTHOR Branigan, Thomas L.
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ABSTRACT

Until recently, U.S. engineering education and American industry drew candidates from only about 43 percent of the potential market--white males. Many segments of American business, education, and government have been involved in a process to increase minority participation in engineering; the 1974 freshmen engineering enrollment for women increased 69 percent, versus 30 percent for Blacks and 22 percent for Mexican-Americans in 1974. Efforts by industry to increase minority interest in engineering are reported, but the need for additional programs is evidenced by the low influx of minority workers into the job market. In a series of recommendations directed to this topic, the author states, that among other things, (1) companies should not concentrate recruiting efforts solely on the national level and in their headquarters community, and (2) the development of cost-effective techniques for reaching minorities outside of urban areas is needed. (CP)

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THE ROLE OF INDUSTRY IN MINORITY ENGINEERING PROGRAMS

THOMAS L. BRANIGAN

DIRECTOR, COMMUNITY & EDUCATIONAL RELATIONS

TRW INC.

CLEVELAND, OHIO

SE020192

THE ROLE OF INDUSTRY IN MINORITY ENGINEERING PROGRAMS

Until very recently, U.S. engineering education was content to draw its students primarily from only about 43% of its potential market--white males. American industry was equally content to accept, without question, the graduates produced by that selection system.

Belatedly, in a reaction to the demands for employment equality from minorities and women (amplified by government regulations) and to the recent slump in engineering enrollments (plus, to a lesser degree, to the social consciences of some academic administrators, faculty members, industry managers and engineers), engineering schools and industry have "discovered" the remaining 57% of the domestic market for engineering students--minorities and women.

(Experience to date has shown us that recruiting and retaining women engineering students is considerably easier and less expensive than recruiting and retaining minority engineering students--freshman engineering enrollment of women increased 69% in 1974, vs. 30% for Blacks and 22% for Mexican-Americans.)

The problem of increasing minority participation in the engineering profession appears to be an issue of common concern to engineering schools and industry. I hope we are ready to marshall our resources

toward achieving the goal set forth in "Minorities in Engineering: A Blueprint for Action," the 1974 report of the Sloan Foundation's ad hoc Planning Commission for Expanding Minority Opportunities in Engineering: approximate population parity for minorities of 18% in the freshman engineering class of 1982. (The Planning Commission, and this paper, defines "minorities"--in terms of the engineering profession--as Blacks, Mexican-Americans, Puerto Ricans and American Indians.)

This is a hard, tough goal. The freshman class of 1982 will enter the sixth grade this fall, and one of the things we think we've learned about motivating minorities to consider engineering as a career is that they must be reached early--in their junior high years--so that they will plan to take the required high school mathematics and science courses.

The purpose of this paper is to look at ways in which industry, with its vested interest in seeing that minority engineering enrollments reach population parity as soon as possible, can work with engineering education in achieving that goal.

What Industry Is Doing

Some companies, like some engineering schools, are leaders in efforts to increase minority participation in engineering. Other companies are followers and some, I'm afraid, still are waiting to be convinced because

increasing the number of minorities in engineering is expensive and industry is (rightfully) expected to bear a portion of the cost.

Although some schools and some companies have been involved in this effort for many years, it's generally conceded that the "modern era" began with a speech at General Electric's 1972 Engineering Education Conference by J. Stanford Smith, then a GE senior vice president and now International Paper Co. chairman. Mr. Smith pointed out that less than one percent of 1971 engineering graduates were Black, which meant that companies dependent on technically-educated management could expect to have Blacks in perhaps one percent of their top management positions by 1990 (at GE, and at TRW, 60% of current members of top management have technical educations). He called for a 10- or 15-fold increase in minority engineering graduates within a decade or "industry will not be able to achieve its goals of equality, and the nation is going to face social problems of unmanageable dimensions...")

Viewing with alarm and recommending massive programs to alleviate pressing national problems is sometimes a trait of industrialists as well as of academicians and politicians. In this case, however, Mr. Smith committed the resources of one of the largest employers of engineers to work the problem. Today GE is the recognized corporate leader in the effort to increase minority participation in engineering, not only on the

basis of the scale of the company's efforts in traditional channels such as grants for scholarships and program development, but also their innovations such as the "Quincy" comic book and the Expo-Tech traveling exhibit, their stimulation of GE departments around the country to initiate and/or get involved in local efforts, and their national leadership of organizations such as ME^3 (Minority Engineering Education Effort) and the National Academy of Engineering.

Let me cite just two other examples of innovative industrial involvement. One is IBM's Faculty Loan Program, through which 33 company employees spent this past school year as visiting faculty members on campuses serving minority, disadvantaged and handicapped students--including the campuses of the six predominantly Black engineering schools. A second example is the Xerox Science Consultant Program, under which technical employees voluntarily spend two half-days per month in Rochester, N.Y. inner-city elementary school classrooms, conducting science experiments and providing students with an on-going relationship with an engineer or scientist role model.

GE, IBM and Xerox are leaders in helping increase minority participation in engineering. (And, it's interesting to note, these three firms were ranked in the top five companies in terms of corporate social responsibility in a recent poll of TRW managers. In the future, I think it also

will be interesting to watch the impact of minority and women managers on corporate social responsibility as well as on profit.)

Some other companies have been busy, of course. Within TRW, for instance, Mexican-American employees of our Systems group formed COY (Career Opportunities for Youth) in the Los Angeles area in 1966 to help combat the high school dropout problem, and several students assisted by COY are now majoring in engineering. My company funded its first scholarship or fellowship for a minority engineering student in 1970, and since has expanded that effort to include some 15 engineering schools. (In the majority of these 15 schools, TRW made the first contact.)

But industry--and engineering education--must do far more if the ambitious 1982 goal is to be reached. And reaching that goal is going to be expensive. Experience to date has taught us that it costs considerably more to reach, recruit and retain the minority engineering student.

What Industry Can Do

Industry must be involved in two ways. The first, of course, is direct financial support, primarily for scholarships. The newly-formed National Fund for Minority Engineering Students is expected to play a major role in raising funds for such financial aid. Financial support

also is needed for motivational programs such as MITE (Minority Introduction To Engineering) and for minority recruiting, remedial and tutorial programs.

The second way in which industry must be involved, if we are to succeed, is by providing support through company employees, jobs and services. Although this type of support represents a less direct cost to the company, it too usually is an expense--but an expense that in some cases may be more valuable than direct financial assistance. In this category, I include such things as managerial involvement in national, regional and local programs, providing summer and co-op jobs, the donation of printing and other in-house services, and making employees available as role models. I want to emphasize the latter type of support, as I believe the ready availability of employees--particularly minority employees--may well be a company's greatest resource to contribute to this effort.

ASEE's Relations With Industry Division, through its Affirmative Action Guidance Project, currently is attempting to motivate the Society's Industrial Member firms and individual ASEE members from industry to get involved in guidance efforts aimed at minorities and women. We've started to explore what is being done and what needs to be done in urban areas such as Houston, Cleveland, St. Louis, San Francisco and Los Angeles, on a statewide basis in Indiana, and on a regional basis in the

South in cooperation with Atlanta-based CIMPEAT (Committee to Increase Minority Participation in Engineering, Architecture and Technology). Through this project, RWI hopes to establish a variety of successful models which can be replicated elsewhere, as appropriate.

Some of the ideas we're considering in Cleveland, where we're working through the guidance committee of the Cleveland Technical Societies Council, include traditional approaches such as seminars for high school students and math and science teachers (TRW recently hosted its first Careers in Technology seminar); co-sponsorship of the local science and engineering fair; plant tours; and promotion of JETS chapters and engineering-oriented Explorer posts. Some of our more innovative ideas, yet to be tried, include the establishment of a central communications point for periodic mailings to teachers and counsellors to keep them up to date on what's happening in engineering and to respond to students, parents, teachers and counsellors seeking information and/or assistance; compliation of a roster of minority and women engineers in local industry available as role models; and the publication of a brochure picturing local minority role models engaged in a variety of engineering disciplines.

RWI members and friends in Houston have organized a technical careers committee of the Engineers' Council of Houston which will place special emphasis on minorities. The committee's initial objectives include the

establishment of a central contact point for the collection and distribution of engineering guidance information; a public relations program aimed at students; counseling services for students, parents, counsellors, and math and science teachers; support of career education in local school systems; and support of related programs such as science fairs and JETS.

Some Personal Recommendations

On the basis of my involvement to date in efforts to increase minority participation in engineering, I'd like to offer the following personal recommendations:

1. Every engineering school and every significant employer of engineers should participate in the effort to attract minorities to engineering.
2. Companies should not concentrate their efforts solely on the national level and in their headquarters community.
3. Efforts to date have focused on Blacks in the urban areas; we need to develop cost-effective techniques for reaching all minorities, including those in the rural areas of the South and Southwest.
4. We should not automatically exclude minorities beyond high school age. In particular, firms in communities with evening engineering education programs should review their minority employees for potential engineers.
5. At the risk of riling RWI's Women's Action Group or my "fellow"

members of ASEE's Women in Engineering Committee, I want to suggest that we avoid the temptation to play the numbers game by diverting support from minority programs to women's programs on the basis that women students have been easier and less expensive to recruit and retain. There is a pressing need for both types of programs, but the financial needs of minority programs are far greater. (The afore-mentioned "Minorities in Engineering" report, by the way, argues that Black college-bound women are the most readily available pool of potential minority engineering students.)

6. Increased governmental financial assistance is going to be required. Where feasible, academia and industry should lobby together for such support.

Most ASEE papers prepared by industry representatives have as their theme some bone to pick with engineering education. In this case, I think industry and engineering education share a common problem and need to work together for our common good--and for the good of those minority men and somen who have the ability to enter the engineering profession, given the opportunity.